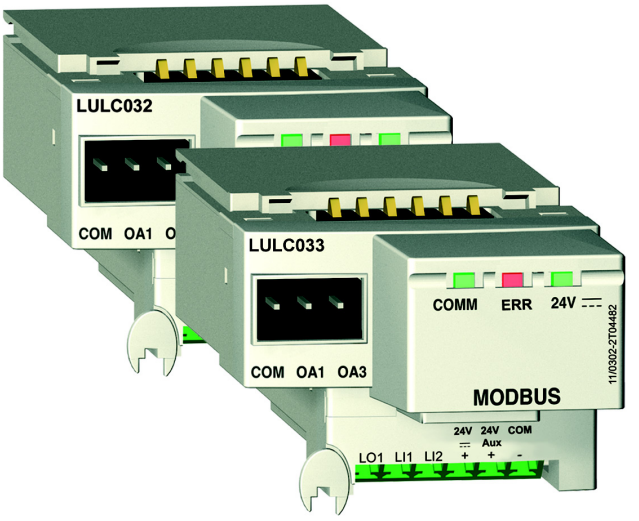
Modbus LULC032-033 Communication Module
User's Manual

05/2005



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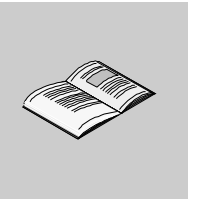

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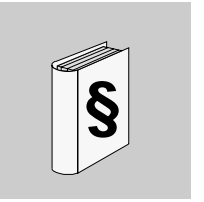
Safety Information



Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation, which **will result** in death, serious injury or equipment damage.

⚠ WARNING

WARNING indicates a situation presenting risks liable to **provoke** death, serious injury or equipment damage.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation, which,**can result** in personal injury or equipment damage.

PLEASE NOTE

Electrical equipment should be serviced only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material. This document is not intended as an instruction manual for untrained persons.
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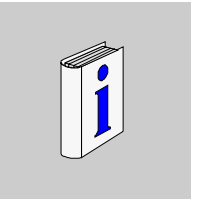
About the Book



At a Glance

Document Scope

This manual describes the setup, functions and operation of the LULC032-033 Modbus communication module.

Area of application: mainly control system applications in the Industry and Building sectors.

Validity Note

The data and illustrations in this manual are not contractual. We reserve the right to modify our products in line with our policy of continuous development. The information given in this document may be modified without notice and must not be interpreted as binding on the part of Schneider Electric.

Related Documents

Title of Documentation	Reference Number
LU•B•/LU•S• Model U Starters Instruction Sheet	1629984
LUTM• Model U Controller Instruction Sheet	1743236
LUC• Control Units Instruction Sheet	1629990
LUCM/LUCMT Multifunction Control Unit User's Manual	1743237
LUTM• Model U Controller User's Manual	1743233
Internal Communication Variables User's Manual	1744082
Electromagnetic Compatibility of Industrial Networks and Fieldbuses	TSX DG KBL F
Modbus Over Serial Line, Specification & Implementation Guide	Modbus_over_serial_line_V1

Product Related Warnings

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All relevant local safety regulations must be followed when installing and using this product. For safety reasons and to ensure conformity with the documented system data, only the manufacturer is authorized to repair the components.

User Comments

We welcome your comments about this document. You can reach us by e-mail at techpub@schneider-electric.com

Hardware Setup

I

Introduction to Hardware Setup

Introduction

This section describes the LULC032-033 Modbus communication module installation and technical characteristics.

What's in this Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
1	Installing the LULC032-033 Modbus module	11
2	Technical Characteristics	37

Installing the LULC032-033 Modbus module

1

Introduction to Installation

Introduction

This chapter introduces the LULC032-033 Modbus communication module and describes the various steps involved in the physical installation of the product.

> ⚠ CAUTION
>
> **HAZARDOUS OPERATION**
>
> These devices must be installed, configured and used by qualified staff only.
> Users must follow all current instructions, standards and regulations.
> Check the function settings before starting the motor.
> Do not downgrade or modify these devices.
>
> **Failure to follow this instruction can result in injury or equipment damage.**

> ⚠ CAUTION
>
> **PRECAUTIONS WHEN USING COMMUNICATION VARIABLES**
>
> Only use the serial link for transmitting data that is not critical to the application. There is some delay in the transmission of data relating to motor-starter states and load-current values. This data must not therefore be used in the management of safety devices and emergency stops.
> Data such as Forward, Reverse and Stop must not be used in safety and emergency-stop circuits.
>
> **Failure to follow this instruction can result in injury or equipment damage.**

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
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Presentation of the LULC032-033 Modbus Communication Module

Receiving the Product

On opening the box containing the LULC032-033 Modbus communication module, you should find the following items:
An Instruction Sheet (IS), providing brief pictorial information on standard installation of the module.
A LULC032-033 Modbus communication module equipped with connectors.

Note: Check that you actually have all the items described above. Make sure that the Instruction Sheet is included, along with the correctly inserted connectors.

Functions Offered

The communication module is used to control a motor-starter remotely, via Modbus, from:

		LULC032	LULC033
TeSys model U starter-controller	LUB••/LU2B••		√
TeSys model U starter	LUS••/LU2S••		√
TeSys model U controller	LUTM••	√	√

Note : Modbus LULC032 communication modules shall be used exclusively with LUTM10BL or LUTM20BL controllers.

Using the communication module, you can:
- Read the motor-starter states
- Control the motor-starter (reversing or non-reversing)
- Adjust the protection functions
- Read the data processed in the advanced and multifunction control units
- Read the state of the I/O (controller base)

⚠ DANGER

CONTROL VOLTAGE

The LULC032-033 Modbus communication module must only be used with 24 V ⎓ control units (LUC•••BL).

Failure to follow this instruction will result in death, serious injury, or equipment damage.

Note: For information on the Modbus protocol, please refer to the following website: www.Modbus.org.

Data Available

The available protection and control data depends on the control unit with which the Modbus communication module is used.

There are 3 types of control unit:
- Standard (referenced as LUCA)
- Advanced (referenced as LUCB/C/D, LUCBT/DT)
- Multifunction (referenced as LUCM/MT)

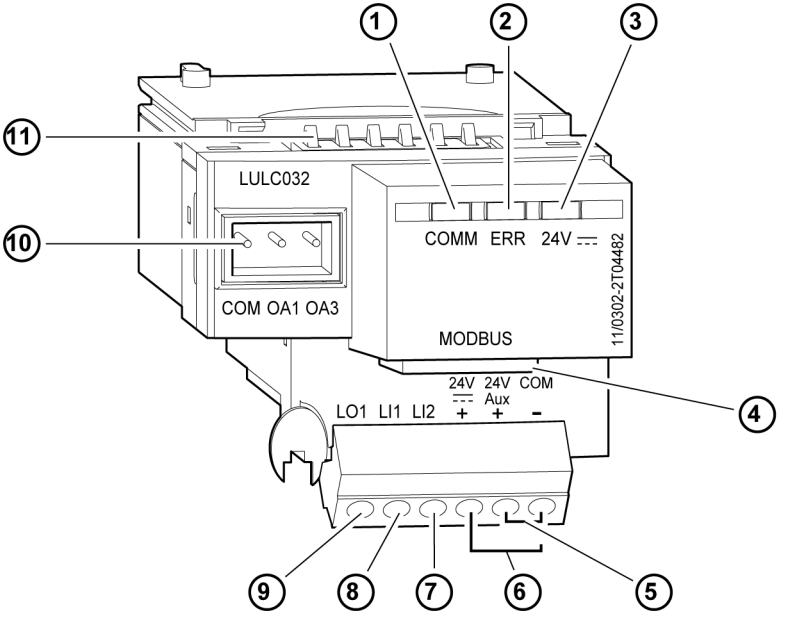
The table below can be used to check the data and commands you can access with each type of control unit:

Data - Commands	Control unit		
	Standard (LUCA)	**Advanced (LUCB/C/D, LUCBT/DT)**	**Multifunction (LUCM/MT)**
Start and stop commands	√	√	√
Status (ready, running, fault condition)	√	√	√
Warning		√	√
Automatic reset and remote reset via the bus		√	√
Indication of the motor load		√	√
Differentiation of faults		√	√
Remote parameter setting and viewing of all functions			√
"Log" function			√
"Monitoring" function			√

Description of the Module and Installation

Diagram of the Module

Connectors and indicator lights (LEDs) on the LULC032-033 Modbus communication module:



Note: The pinout differs from that on the LULC031 Modbus communication module.

1 Green "COMM" Modbus communication status LED.
2 Red "ERR" Modbus communication module fault indication LED.
3 Green "24V ⎓" LED indicating voltage presence at outputs OA1, OA3, LO1.
4 RJ45 connector for the Modbus RS485 link.
5 Connection of the module power supply.
6 Connection of the 24 V ⎓ power supply for outputs OA1, OA3, LO1.
7 Discrete input 2.
8 Discrete input 1.
9 Discrete output 1, assignable depending on the configuration register (685 LSB).
10 24V ⎓ prewired coil connector for the power base.

- The assignment of OA1 depends on the configuration register (686 LSB).
- The assignment of OA3 depends on the configuration register (686 MSB).

11 Connector for communication with the advanced or multifunction control unit.

Description of Indicator Lights (LEDs)

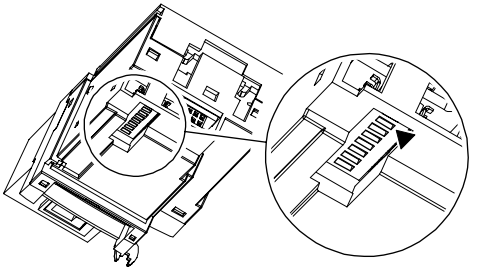
Description of the various states of the indicator lights (light emitting diodes, LEDs) on the LULC032-033 Modbus communication module.

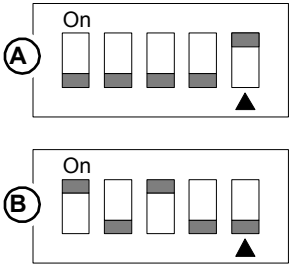
Light Emitting Diodes (LEDs)			Meaning
Green "COMM" LED	**Red "ERR" LED**	**Green "24V ⎓" LED**	
Flashing (alternately with the "ERR" LED)	Flashing (alternately with the "COMM" LED)	On	Bus parameter initialization in progress
Flashing during communication with the Module address	Off	On	Normal operation
Off	Off	Off	Faulty: 24 V DC voltage missing on the 24 V DC terminal. Check the connection between the power supply and the communication module
	On	On	Internal fault on the LULC032-033 *Internal faults, p. 69*
	Flashing	On	Loss of communication on the Modbus network

Note: During startup, because the default fallback mode is "forced stop", if no communication has previously been established, the red "ERR" LED will flash after one minute (default timeout value).

Addressing Using Switches

The Modbus communication module address is defined by switches located on the underside of the module. Simply turn the module over to access them:





A) The module is factory-supplied with address 1.

B) Example of configuration for address 20.

The range of accepted values is between 1 and 31.
The address coding is in binary format.
The **least significant bit** is on the right, indicated by ▲.
Address 0 is not taken into account by the module, since it is used by the Master for a broadcast request.
Caution: Address selection differs from that on the LULC031 Modbus communication module.

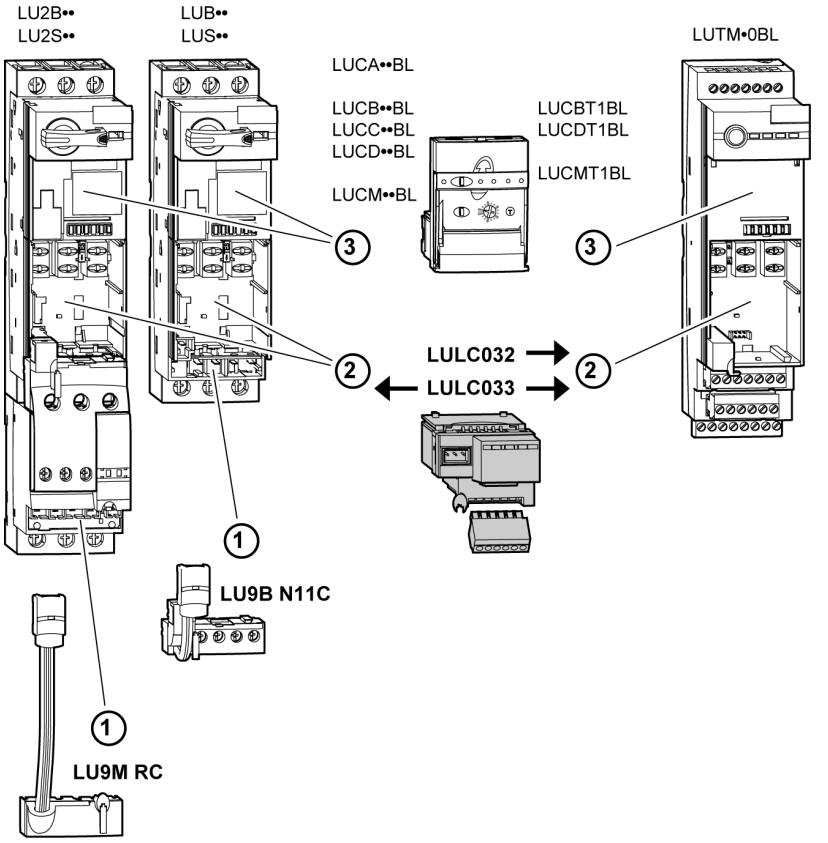
Note: Addressing is only taken into account when the communication module is powered up.

Order of Mounting on a Base

The LULC032 module is installed in a controller base, the LULC033 module is installed in a power base or a controller base, on the underside of the control unit which locks it in position.
To install the module in the power base or controller base:

Step	Action
1	Choose the prewired coil connection terminals.
2	Insert the LULC032-033 Modbus communication module.
3	Insert the control unit which locks the module.

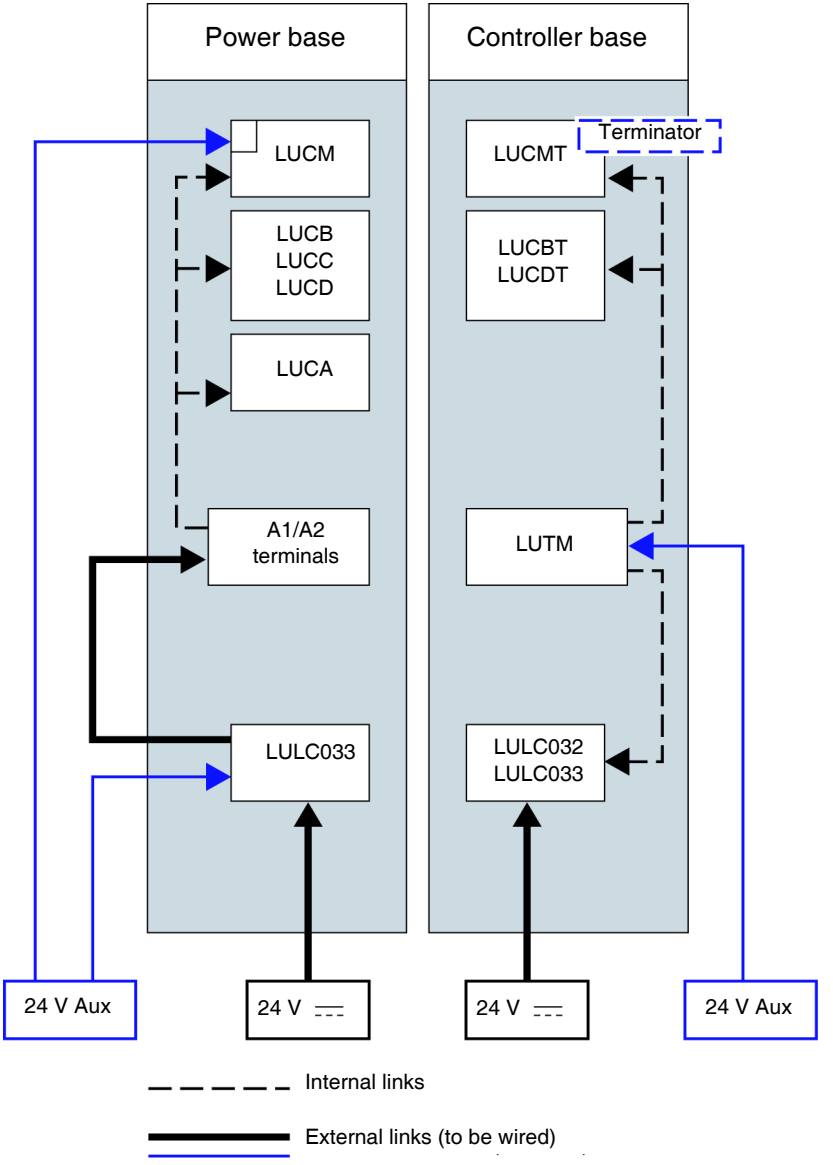
The diagram below illustrates these steps. Installation of the LULC032-033 Modbus communication module corresponds to step (2). The numbers indicate both the order of mounting for the components and their location.



Electrical Connection

24 V ⎓ and 24 V Aux Power Supply

Schematic for 24 V ⎓ and 24 V Aux power supplies.



Power-up With an LUCM Multifunction Control Unit

LUCM and Power Base

The power supply source must be the same for the LULC032-033 Modbus communication module and the LUCM multifunction control unit.
It is essential that the LUCM multifunction control unit and the LULC032-033 Modbus communication module are powered up simultaneously. Indeed, monitoring of the internal dialog between the LUCM and the LULC032-033 will produce two error messages depending on the order in which these objects were powered up.
When the A1-A2 terminals are not yet powered up (24V ⎓), there are 3 possible scenarios for powering up the **24V Aux**:

Powering up the LUCM ...	Powering up the LULC032-033 ...	Comment
simultaneously		Recommended
1st	2nd	The "**M15**" fault is displayed. This only occurs when the LULC032-033 Modbus communication module has already been used with the LUCM multifunction control unit.
2nd	1st	The LUCM control unit is identified by the LULC032-033 Modbus communication module when the 24 V Aux for the LULC032-033 Modbus communication module is switched on. If the 24 V Aux for the LUCM control unit is switched on for longer than twice the duration of the timeout (ie. more than 1 s), the "**M101**" fault is displayed (register 451, communication module internal faults).

Note: Both these faults are reset by powering down and then powering up the LULC032-033 Modbus communication module (power cycle) and the LUCM control unit.

LUCM and Controller Base

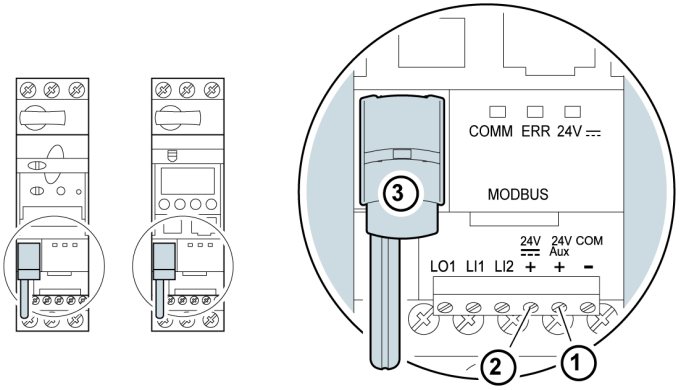
The 24 V ⎓ module power supply is provided by the LUTM controller.

Power supply for the LULC032-033 and Outputs OA1, OA3 and LO1

In order to operate, the LULC032-033 Modbus communication module must be powered by a 24 V ⎓ source:

- With a power base, LULC033 must be powered by an external source.
- With a controller base, LULC032 or LULC033 is powered directly.

Power Supply for LUB••/LUS•• /LU2B••/LU2S•• Power Bases

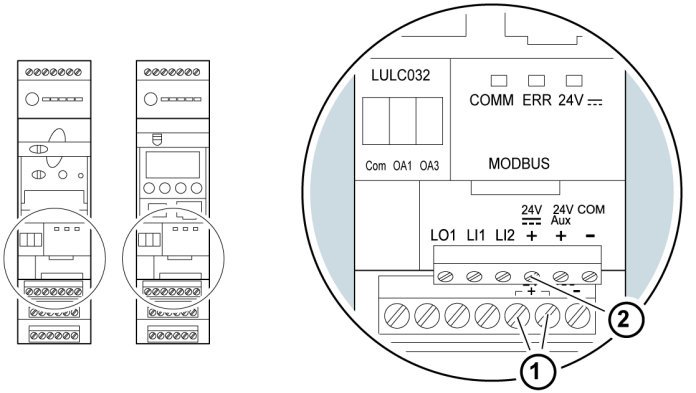


1 24 V Aux: Power-supply terminal for the LULC033 Modbus communication module.

2 24 V ==: Power-supply terminal for outputs OA1 OA3 and LO1.

3 Prewired link for connecting outputs OA1 and OA3 to terminals A1/A3/A2 on the starter.

Power Supply for an LUTM Controller Base



1 24 V ==: Power-supply terminals for the LUTM and the LULC032-033 Modbus communication module via an internal link.

2 The 24 V == power supply for the LULC032-033 Modbus communication module is only required when using outputs OA1, OA3 and LO1.

Power Base: Terminal Power Supply

The user has two options for connecting the **power base** terminals:

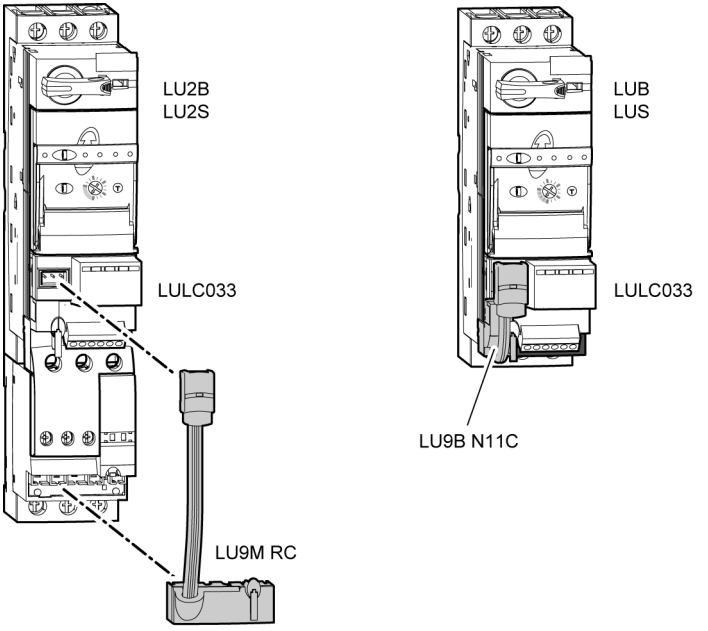
- Power supply via the LULC033 Modbus communication module with a prewired link
- Direct power supply with a wire-to-wire link

Prewired Link

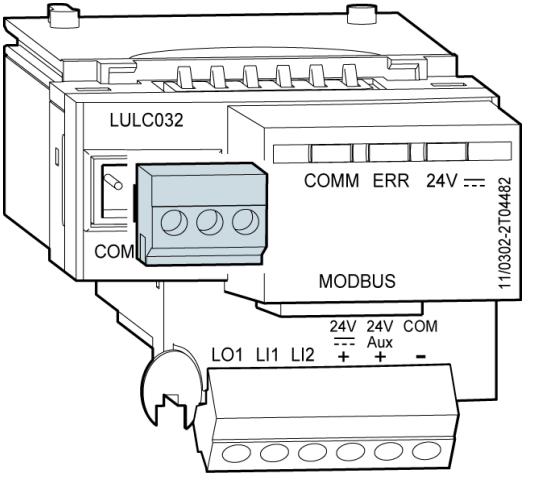
References of the two prewired coils:

Designation	With a power base	Reference
Prewired coil	LUB••/LUS••	LU9B N11C
	LU2B••/LU2S••	LU9M RC

Illustration for both types of power base:



Wire-to-Wire Link (Power Supply to Outputs OA1, OA3 and LO1)
This type of link is compulsory in the case of a reversing starter-controller created from an LU6M reversing unit, for separate assembly.



The wire-to-wire link can also be used to insert a local or external stop command, for example.

Connection Capacities of the LULC032-033 Terminals

The table below shows the conductor cross-sections to be used:

Connection	Type of conductor	Cross-section (min. - max.)
1 conductor	• Solid conductor • Stranded conductor	• 0.14 to 1 mm^2 • 0.14 to 1 mm^2 (AWG 28 to AWG 16)
	Stranded conductor with cable end: • Non-insulated • Insulated	• 0.25 to 1 mm^2 • 0.25 to 0.5 mm^2
2 conductors (same cross-section)	• 2 solid conductors • 2 stranded conductors 2 stranded conductors with cable end: • Non-insulated • Insulated	• 0.14 to 0.5 mm^2 • 0.14 to 0.75 mm^2 • 0.25 to 0.34 mm^2 • 0.75 mm^2

Connectors	3 and 6 pts
Pitch	3.81 mm
Tightening torque	0.2/0.25 N.m.
Flat screwdriver	2.5 mm (0.10 in.)

Connection to the RS485 Bus

General

There are several ways in which the user can connect the communication module to the RS 485 bus:

- Direct connection to the bus via a VW3A8306TF•• T-junction box
- Connection to the bus via a splitter box
- Connection to the bus via SCA type junction boxes

For Interference Protection:
Use the Telemecanique cable with 2 pairs of shielded twisted conductors (references: TSXCSA100, TSXCSA200, TSXCSA500, VW3A8306TF••).
Keep the Modbus cable away from the power cables (at least 30 cm).
Create crossovers of the Modbus cable and the power cables at right-angles, if necessary.

Note: For more information, consult the guide TSX DG KBL F: "Electromagnetic compatibility of industrial networks and fieldbuses".

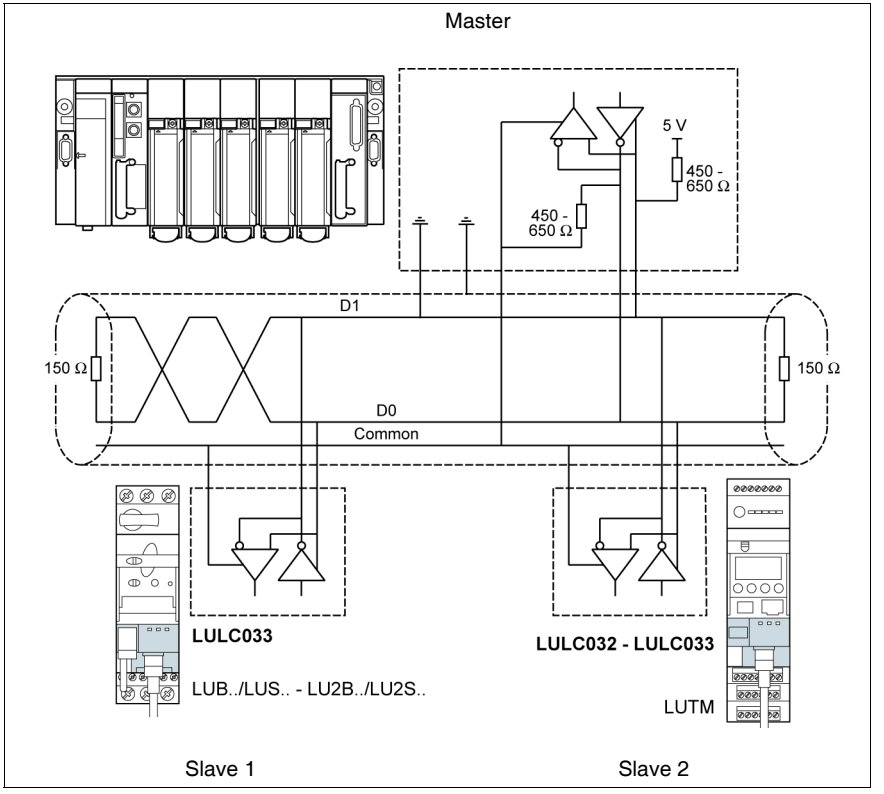
The RS 485 standard allows variants of some characteristics:

- Polarization
- Line termination
- Number of slaves
- Length of bus

The new Modbus specification, published in 2002 on the Modbus.org site, defines all these characteristics precisely. All new Telemecanique devices complying with this specification.

Connection to the Bus via a Tee

The standard schematic corresponds to the Modbus specification published in 2002 on the Modbus.org site (Modbus_over_serial_line_V1.pdf, Nov 2002) and in particular to the 2-wire multidrop serial bus schematic.
The LULC032-033 Modbus communication module complies with this specification.
The simplified schematic is as follows:

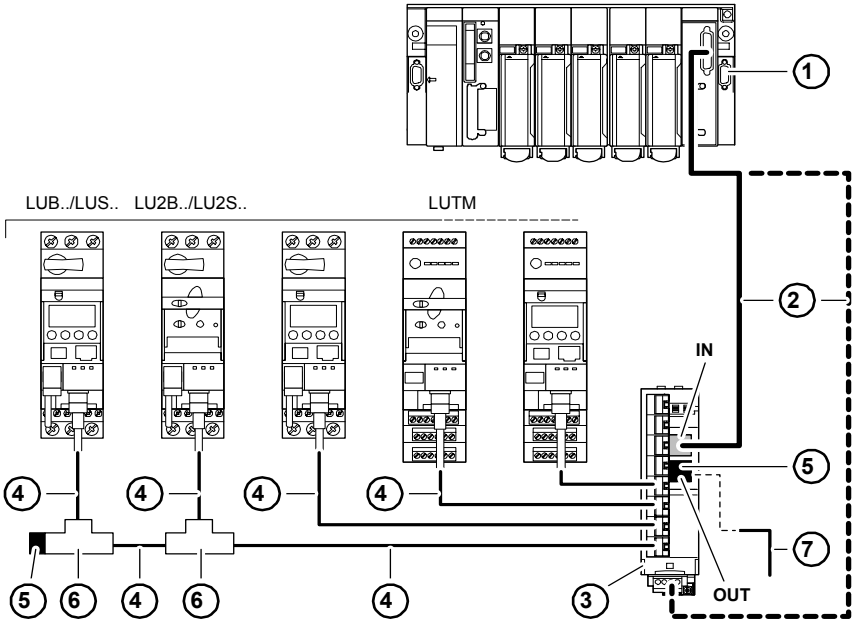


The characteristics for direct connection to the bus are as follows:

Designation	Description
Type of trunk cable	Single shielded twisted pair cable and at least a 3rd conductor
Maximum length of bus	1000 m at 19200 bps with the Telemecanique TSX CSA•• cable
Maximum number of stations (without repeater)	32 stations, ie. 31 slaves
Maximum length of tap-offs	• 20 m for one tap-off • 40 m divided by the number of tap-offs on the multiple junction box
Bus polarization	• A 450 to 650 Ohm pulldown resistor at the 5 V • A 450 to 650 Ohm pulldown resistor at the Common This polarization is recommended for the master. There is no polarization at the RS 485 point where the communication module is connected.
Line termination	A 150 Ohm resistor +/- 5%
Common polarity	Yes (Common), connected to the protective ground in at least one point on the bus

Connection to the Bus via a Splitter Box

The schematic for connection to the bus via a splitter box is as follows:



1 Master (PLC, PC or communication module)

2 Modbus cable depending on the type of master (with polarization integrated on the master side or on another part of the bus)

3 Modbus splitter box LU9 GC3

4 Modbus cables VW3 A8 306 R••

5 Line terminators VW3 A8 306 R

6 Modbus T-junction boxes VW3A8306TF•• (with cable)

7 Modbus cable (to another splitter box) TSX CSA•00 (replaces (5))

Note: It is advisable to place a line terminator at each end of the bus to avoid malfunctions on the communication bus. This means that a tee should not have a free connector. It is either connected to a slave or to the master, or there is a line terminator.

Note: It is important to connect the bus to the "IN" input (or the lower end of the screw terminals) of the splitter box. Connection to another splitter box is made via the "OUT" output.

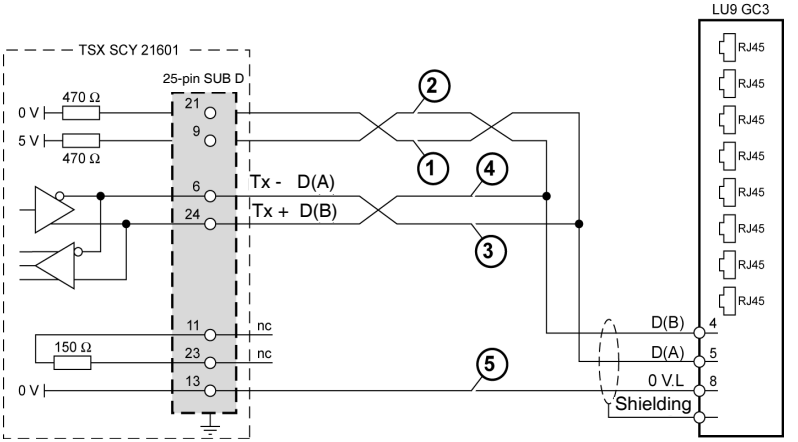
Connection Schematics (PLC <=> Splitter Box)

The two schematics below describe the connection between:

- TSX SCY 21601 module (channel 0) and LU9 GC3 splitter box with TSX SCY CM6030 cable
- TSX SCP 114 PCMCIA card and LU9 GC3 splitter box with TSX SCP CX4030 cable.

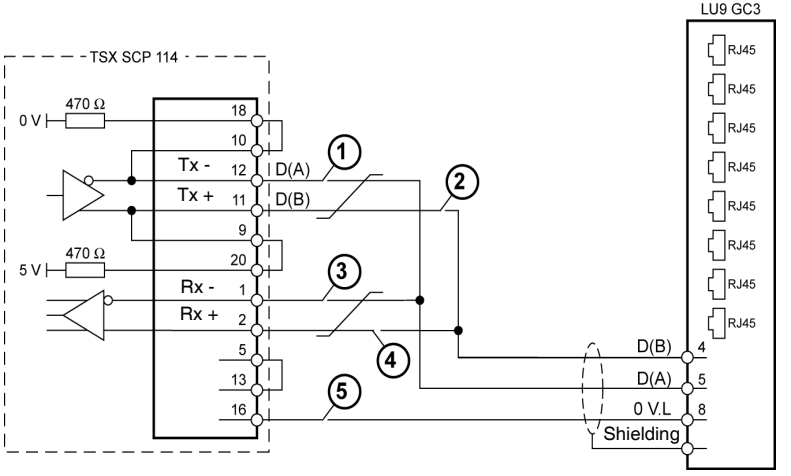
Note: Ensure that the 470 Ohm resistors are connected to the 0 V and 5 V polarities correctly.

Connection between TSX SCY 21601 module (channel 0) and LU9 GC3 splitter box with TSX SCY CM6030 cable:



1	Green/White	**3**	Orange/White	**5**	Brown/White
2	White/Green	**4**	White/Orange		

Connection between PCMCIA card/TSX SCP 114 and LU9 GC3 splitter box with TSX SCP CX4030 cable:



1	Green/White	**3**	White/Orange	**5**	Brown/White
2	White/Green	**4**	Orange/White		

List of connection accessories:

Name and description			Reference
Modbus splitter box		10 RJ45 connectors and 1 screw terminal	LU9 GC3
Modbus T-junction boxes		With 0.3 m integrated cable	VW3 A8 306 TF03
		With 1 m integrated cable	VW3 A8 306 TF10
Line terminators	For RJ45 connector	R = 150 Ohms	VW3 A8 306 R

List of connection cables:

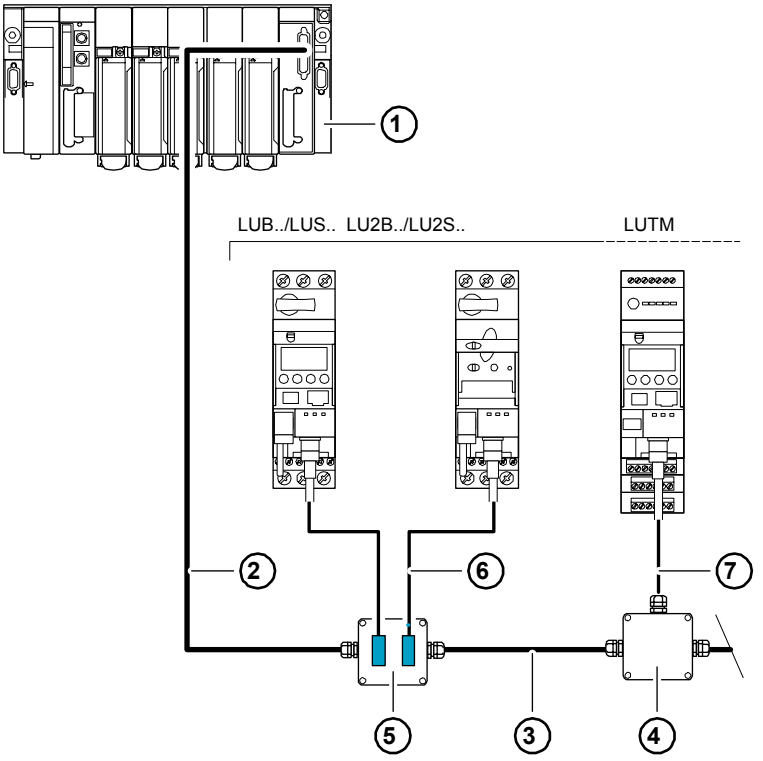
Name and description	Length (meters)	Connectors	Reference
Cables for Modbus bus	3	1 RJ45 connector and 1 stripped end	VW3 A8 306 D30
	0.3	2 RJ45 connectors	VW3 A8 306 R03
	1		VW3 A8 306 R10
	3		VW3 A8 306 R30
RS 485 double shielded twisted pair cables	100	Supplied without connector	TSX CSA 100
	200		TSX CSA 200
	300		TSX CSA 500

List of Modbus connection accessories for RJ45 wiring system:

Type of master	Interface with the master	Description	Reference
Twido PLC	Mini-DIN RS 485 adaptor or interface module	3 m cable equipped with a mini-DIN connector and an RJ45 connector	TWD XCA RJ030
	Screw terminal RS 485 adaptor or interface module	3 m cable equipped with an RJ45 connector and stripped at the other end	VW3 A8 306 D30
TSX Micro PLC	Mini-DIN RS 485 terminal socket	3 m cable equipped with a mini-DIN connector and an RJ45 connector	TWD XCA RJ030
	PCMCIA card (TSX SCP114)	Stripped cable	TSX SCP CX4030
TSX Premium PLC	TSX SCY 11601 or TSX SCY 21601 module (25-pin SUB-D port)	Cable equipped with a 25-pin SUB-D connector and stripped at the other end (for connection to the screw terminals on the LU9GC3 splitter box)	TSX SCY CM6030
	PCMCIA card (TSX SCP114)	Stripped cable	TSX SCP CX4030
Fipio (LUFP1) or Profibus DP (LUFP7) or DeviceNet (LUFP9) gateway	RS 485 RJ45	Cable equipped with 2 RJ45 connectors, of the following length: - 0.3 m - 1 m - 3 m	 VW3 A8 306 R03 VW3 A8 306 R10 VW3 A8 306 R30
Serial port PC	PC with 9-pin male SUB-D RS 232 serial port	- RS 232/RS 485 converter - 3 m cable equipped with an RJ45 connector and stripped at the other end (for connection to the screw terminals on the LU9GC3 splitter box)	TSX SCA 72 VW3 A8 306 D30

Connection to the Bus via SCA Junction Boxes

The schematic for connection to the bus via SCA junction boxes is as follows:



1 Master (PLC, PC or communication module).

2 Modbus cable depending on the type of master (with polarization integrated on the master side or on another part of the bus).

3 Modbus cable TSX CSA•00.

4 Junction box (without line polarization) TSX SCA 50.

5 Subscriber socket (without line polarization) TSX SCA 62.

6 Modbus drop cable VW3 A8 306.

7 Modbus drop cable VW3 A8 306 D30.

List of connection accessories:

Name and description	Reference
Junction box 3 screw terminals and RC line termination, connected with cable VW3 A8 306 D30	TSX SCA 50
Subscriber socket 2 15-pin female SUB-D connectors, 2 screw terminals, and RC line termination, connected with cable VW3 A8 306 or VW3 A8 306 D30	TSX SCA 62

List of connection cables:

Name and description	Length (meters)	Connectors	Reference
Cables for Modbus bus	3	1 RJ45 connector and 1 stripped end	VW3 A8 306 D30
	5	1 RJ45 connector and 1 15-pin male SUB-D connector for TSX SCA 62	VW3 A8 306
RS 485 double shielded twisted pair cables	100	Supplied without connector	TSX CSA 100
	200		TSX CSA 200
	300		TSX CSA 300

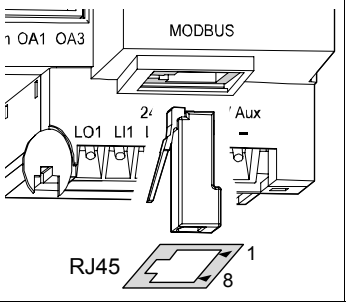
List of Modbus connection accessories for **junction box on screw terminals**:

Type of master	Interface with the master	Description	Reference
Twido PLC	Screw terminal RS 485 adaptor or interface module	Modbus cable	TSX CSA100 or TSX CSA200 or TSX CSA500
TSX Micro PLC	Mini-DIN RS 485 terminal socket	Junction box	TSX P ACC 01
	PCMCIA card (TSX SCP114)	Cable equipped with a special connector and stripped at the other end	TSX SCP CX4030
TSX Premium PLC	TSX SCY 11601 or TSX SCY 21601 module (25-pin SUB-D port)	Cable equipped with a 25-pin SUB-D connector and stripped at the other end	TSX SCY CM6030
	PCMCIA card (TSX SCP114)	Cable equipped with a special connector and stripped at the other end	TSX SCP CX4030
Profibus DP (LA9P307) gateway	RS 485 RJ45	3 m cable equipped with an RJ45 connector and stripped at the other end	VW3 A8 306 D30
Fipio (LUFP1) or Profibus DP (LUFP7) or DeviceNet (LUFP9) gateway	RS 485 RJ45	3 m cable equipped with an RJ45 connector and stripped at the other end	VW3 A8 306 D30
Serial port PC	PC with 9-pin male SUB-D RS 232 serial port	RS 232/RS 485 converter and Modbus cable	TSX SCA 72 and TSX CSA100 or TSX CSA200 or TSX CSA500

RJ45 Connector Pinout

The communication module is connected to the Modbus network with an RJ45 connector in compliance with the following wiring:

Pin no.	Signal
1	Do not connect
2	Do not connect
3	Do not connect
4	D(B) or D1
5	D(A) or D0
6	Do not connect
7	Do not connect
8	0 V.L



Technical Characteristics

2

Introduction to the Technical Characteristics

Introduction

In addition to information on the module conditions of use and technical characteristics, this chapter provides instructions on how to replace an LULC031 model with an LULC032-033.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Conditions of Use and Technical Characteristics	38
Replacing an LULC031 Module With an LULC032-033 Module	41

Conditions of Use and Technical Characteristics

The characteristics of the LULC032-033 Modbus communication module are as follows:

- Conditions of Use
- Characteristics of the 24V ⎓ and 24V Aux power supply circuits
- Characteristics of the outputs (OA1, OA3 and LO1) and logic inputs (LI1 and LI2)

The communication characteristics (module Modbus port) are also described.

Conditions of Use

The conditions of use for the LULC032-033 Modbus communication module are as follows:

Certification	UL, CSA		
Conformity to standards	IEC/EN 255-6, UL 508, CSA C22-2 No. 14		
European community directives	CE marking. Satisfies the essential requirements of the low voltage (LV) machinery and electromagnetic compatibility (EMC) directives.		
Ambient air temperature around the device	Storage	°C	- 40 ... + 85
	Operation	°C	- 25 ... + 55

24V ⎓ Power Supply Circuit

The characteristics of the LULC032-033 Modbus communication module 24 V ⎓ power supply circuit are as follows:

Supply voltage	$U_{nominal}$	V	24V ⎓
	Operating range	V	20 ... 28
Maximum current drawn		A	1
Resistance to microbreaks		ms	2

24 V Aux Power-Supply Circuit

The characteristics of the LULC032-033 Modbus communication module 24 V Aux power supply circuit are as follows:

Supply voltage	$U_{nominal}$	V	24V ⎓
	Operating range	V	20 ... 28
Maximum current drawn		mA	30
Resistance to microbreaks		ms	3

Logic Outputs OA1, OA3 and LO1

The characteristics of the LULC032-033 Modbus communication module outputs are as follows:

Nominal output values	Voltage	V	24V ⎓
	Current	mA	500
Output limit values	Voltage	V	20 ... 28
	Current	mA	500
Coincidence factor of the 3 outputs		%	66
Output response time (register 704) (Time between the request start bit and the change in the output state)		ms	5 (LUCA/B/C/D) 15 (LUCM) 30 (LUCBT/DT) 45 (LUCMT) with stop bit
Protection	Against overvoltage		Yes
	Against inversions		Yes
	Against short-circuits and overloads		Electronic circuit-breaker with automatic reset
Number of operating cycles	In millions of operating cycles		15
Maximum rate	In operating cycles per hour		3600

Logic Inputs LI1 and LI2

The characteristics of the LULC032-033 Modbus communication module inputs are as follows:

Nominal input values		Voltage	V	20 ... 28 (positive logic)
		Current	mA	7
Input limit values	At state 1	Voltage	V	16
		Current	mA	6
	At state 0	Voltage	V	5
		Current	mA	2
Response time	Change to state 1		ms	10 +/- 30 %
	Change to state 0		ms	10 +/- 30 %
Type of input				Resistive
Protection	gl fuse		A	1

Communication (Modbus Port)

The technical characteristics of the LULC032-033 Modbus communication module Modbus port are as follows:

Factory configuration			
Physical interface	1	Multidrop RS 485	
Connections		RJ45 on the front panel	
Connection pinout	Schneider standard	D1 (DB) <--> pin 4 D0 (DA) <--> pin 5 OVL <--> pin 8	
Protocol		Modbus RTU	
Physical address	Range	1 to 31 (address 0 not taken into account)	1
Logical address	Range	1 to 31 (addresses 32 to 247 not accessible)	
Transmission speed	Bps	1200, 2400, 4800, 9600, 19200 (automatic configuration up to this value)	19200
Parity		Even, Odd (1 stop bit). No parity (1 or 2 stop bits)	Even*
Turnaround time	ms	5 (LUCA/B/C/D) 130 (LUCM) 7 (LUCBT/DT) 140 (LUCMT)	

* All versions (except LULC032 < V1.3: factory-configured with "No parity").

Replacing an LULC031 Module With an LULC032-033 Module

Mounting

The section below presents the LULC031, LULC032 and LULC033 module characteristics in the form of tables.
Mounting the modules in different types of base:

	LULC031	LULC032	LULC033
Starter-controller **LUB••**/LU2B•• Starter LUS••/LU2S••	Yes	No	Yes
Controller **LUTM•**0BL	No	Yes	Yes

Combining the modules with a control unit:

LULC031	LULC032-033	
LUC•••BL only	**LUC•••**BL only with code date > 0406 (Hardware locating device)	**LUC•**T1BL only (Hardware locating device)

Controlling the I/O

Control of outputs OA1 and OA3 on LULC031 and LULC032-033:

LULC031	LULC032-033	
Starter-controller **LUB••**/LU2B••	Starter-controller **LUB••**/LU2B••	Controller **LUTM•**0BL
Yes	Yes	Yes

Control of output LO1 on LULC031 and LULC032-033:

LULC031	LULC032-033	
Yes	Yes	Yes

Reading inputs LI1 and LI2 on LULC031 and LULC032-033:

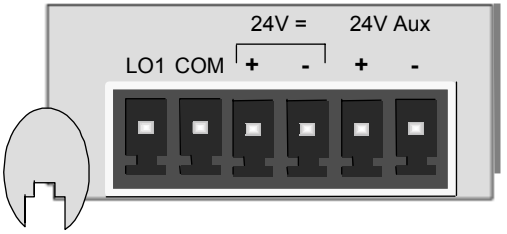
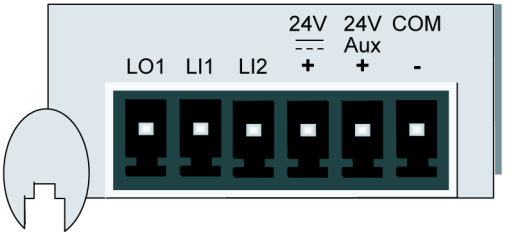
LULC031	LULC032-033	
No	Yes	Yes

Control of outputs 13 and 23 on LULC031 and LULC032-033:

LULC031	LULC032-033	
No	No	Yes

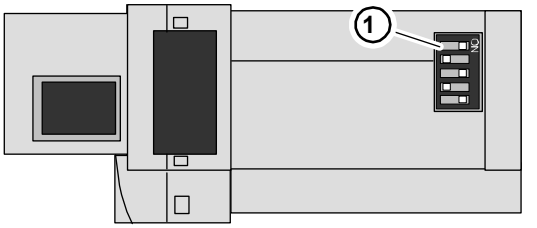
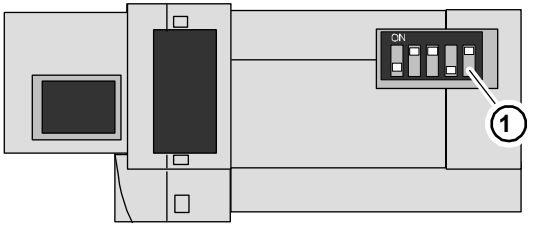
Electrical Connection

The LULC031 and LULC032-033 module terminals look like this:

LULC031	
LULC032-033	 2 additional inputs, reduction in the number of commons

Communication Configuration

The address is selected using switches:

LULC031	 **Speed**: 19200 baud - **Parity**: none/1 stop bit
	(1) Least significant bit
LULC032 **LULC033**	 **Speed**: 19200 baud - **Parity**: even*/1 stop bit

* All versions (except LULC032 < V1.3: factory-configured with "No parity").

Note: The speed and the parity are calculated automatically by the module. The speed indicated is a maximum value.

Software Configuration

Fallback mode on loss of communication (value of default register):

	Starter-Controller LUB••/LU2B•• Starter LUS••/LU2S••	Controller LUTM•0BL
LULC031	682 = 0 No detection of loss of communication	-
LULC032	-	681 = 6000 (timeout = 60 seconds) 682 = 2 (fallback mode = forced stop)
LULC033	681 = 6000 (timeout = 60 seconds) 682 = 2 (fallback mode = forced stop)	

Indication of communication losses according to the fallback modes:

LULC031	LULC032-033
Forced stop mode: Fault indicated Other modes: Warning indicated	Any mode: Warning indicated Acknowledgment via register 703 bit 3

Firmware version number:

LULC031	LULC032-033
Register 62 = version no. x 100	Register 62 = version no. x 10,000

Firmware version compatibility:

	Product versions			
	LULC03•	**LUTM**	**LUCM**	**LUCMT**
LULC031	V2.3	---	V1.05, V1.06, V1.10*	---
LULC032	V1.1	V1.1	V1.05, V1.06, V1.10*	V2.06
	V1.2	V1.2*	V1.05, V1.06, V1.10*	V2.10, V2.11*
	V1.3	V1.2*	V1.10*	V2.11*
LULC033	V2.2	V1.2*	V1.10*	V2.11*

** and later versions.*

Software Setup

II

Introduction to Software Setup

Introduction

Once the LULC032-033 Modbus communication module hardware setup phase is complete, the software setup is next. It focuses on configuration (the various operating modes), and the function parameters to be set (eg. protection, current measurement, etc).

What's in this Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
3	Starting up the Module via the Registers	49
4	Fault and Warning Management	63
5	Configuration of Predefined Functions	71

Starting up the Module via the Registers

3

Introduction to Start-Up via the Registers

Introduction

This chapter describes how to start up the LULC032-033 communication module by means of the Modbus registers. It provides general information, describes the data exchange format, the product's factory configuration and how it can be customized, and also the Modbus read and write requests.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
General Information on Start-Up via the Registers	50
Data Exchange Format	51
Factory Configuration	53
Customizing Your Configuration	54
Modbus Requests and Programming Examples	59
Use of the Main Registers for Simplified Management	61

General Information on Start-Up via the Registers

All the LULC032-033 communication module settings are implemented - or simply displayed - via the Modbus registers.

Access to Parameters

The module I/O parameters are set by one of the following three methods:

- The Modbus RJ45 port, via the application PLC
- The LUCM multifunction control unit's terminal port
- Locally, via the LUCM multifunction control unit's keypad

Data Exchange Format

Modbus Format

Communication is based on the slave Modbus RTU protocol.

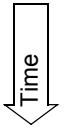
The data format is as follows:

1 start bit	8 data bits	1 parity bit	1 stop bit

Note: The detailed format of these requests is explained on the www.Modbus.org site.

Initialization

Initialization consists of two phases:



When the auxiliary 24 V DC is powered up, the LULC032-033 Modbus communication module is initialized:

- The addressing is taken into account.
- The type of control unit is taken into account.

At the end of the initialization phase, the LULC032-033 Modbus communication module automatically identifies the configuration parameters (speed and parity) of the RS 485 link as soon as traffic is detected on the network.
After analysis of up to 20 frames at a speed of 19200 baud, initialization continues (at 1200 baud, the number of frames is higher):

- The default or configured speed is taken into account.
- The Master parity is taken into account.

Read/Write Zones

The memory zone from 0 to 19,999 can be accessed by the client.

- Reading the zone of a ‘Reserved’ register (or non-set) causes a correct response (value 0).
- Writing to the zone of a ‘Reserved’ register causes a correct response (value 0). The write operation is not taken into account and the contents remains equal to 0.
- Writing to the zone of a ‘Read only’ register causes a response with an exception code (code 03).

The memory zone 2,000 is private and therefore reading/writing is not authorized. All accesses will be signalled by an exception code (code 02).

Exception Code

The presence of an exception code is indicated by the report from the PLC (refer to the Modbus master module documentation).
The Modbus exception codes supported are as follows:

Value of the exception code		Name	Comment
Hexadecimal	Decimal		
0x01	1	Illegal function	Unknown request code
0x02	2	Illegal data address	• Register address invalid • Access to the private memory zone (address ≥ 20000) • Writing to a "read-only" register The memory zone is prohibited in both read and write modes
0x03	3	Illegal data value	• Invalid value The write command is interrupted

Speed and Parity

The recognized values are as follows:

	Possible values	Factory value
Speed	1,200, 2,400, 4,800, 9,600 and 19,200 baud.	19,200 baud
Parity	Even, odd, no parity (parity bit deleted).	Even*

* All versions (except LULC032 < V1.3: factory-configured with "no parity").

TSX Micro or Premium Platform

Applications for Micro and Premium PLCs are programmed using PL7 software. READ_VAR or WRITE_VAR requests *(see Modbus Requests and Programming Examples)* are used to read or write respectively the value of one or more consecutive objects of the same type (bit, word), in PL7 language.

Note: For more details concerning Modbus communication programming within a TSX platform, refer to the PL7 online help, Communication Volume 2/Modbus communication.

Factory Configuration

The communication module parameters are set in order to determine:
- The operating mode
- The thermal overload fault reset mode
- The correspondence between the communication module outputs and the LUTM controller inputs

The parameter registers (Modbus protocol) are accessible in read/write mode. The factory set values are as follows:

Subject	Register	Factory value	Meaning
Reset mode for thermal overload fault	602.0	1	"**Manual**" mode
Enable communication between LUCM/MT and LULC032-033	602.4	1	Communication active
Fallback mode for control outputs on loss of communication	682	2	**Forced stop** Power base: OA1 and OA3 at 0 Controller base: 13 and 23 at 0
Local **operating mode** or via the bus with the LUTM and LULC032-033	683	0	Mode for controlling the LUTM controller outputs "**remotely via the bus**"
Inversion of the LULC032-033 outputs	684	0	The state of the outputs corresponds to the state of the control bits
Assignment of:			
- Output LO1	685 LSB	2	LO1 is the state of control bit 700.0
- Output OA1	686 LSB	12	OA1 is the state of control bit 704.0
- Output OA3	686 MSB	13	OA3 is the state of control bit 704.1
(on controller base)			
- Output 13	687 LSB	12	13 is the state of control bit 704.0
- Output 23	687 MSB	13	23 is the state of control bit 704.1
Recovery mode after a power cut	688	0	The outputs revert to the state they were in before the power cut.
Identification of the control unit	690	0	The control unit is identified automatically

Note: For more information, refer to the "TeSys U Communication Variables" User's Manual.

Customizing Your Configuration

You can use the factory settings *(see Factory Configuration)* or customize your configuration.
The following parameters can be set:

- Control unit configuration
- Control unit ID
- Timeout duration
- Fallback mode
- Control mode with an LUTM controller.
- Inversion of the output states
- Assignment of outputs LO1, OA1, OA3, 13 and 23
- Recovery after a power cut
- Control unit forcing

⚠ WARNING

UNEXPECTED OPERATION

A configuration can be loaded or edited by both Modbus ports (via the communication module or via the control unit LUCM). A configuration can then overwrite another one, as the system does not prevent such an action. The result is not certain.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

Control Unit Configuration (Reg 602)

Register **602** (accessible in read/write mode) is used to configure the control unit (reset mode 602.0-2, and communication 602.4).

Reg•	Value	Comment
602.0	1	Resetting is manual (by default). Bits 1 and 2 are set to 0.
	0	You have activated either bit 1 (remote reset) or bit 2 (automatic reset)
602.4	1	Communication with the LUCM/MT multifunction control unit has been activated.
	0	When forced to 0, this bit inhibits communication between the LUCM/MT multifunction control unit and the LULC032-033 Modbus communication module.

Control Unit ID (Reg 680)

The control unit is identified each time the communication module is powered up. However, the multifunction control unit memorizes the reference of the communication module assembled with it.
To use a multifunction control unit on its own, once it has been used with a communication module, identification register 680 is reinitialized locally via the keypad in the menu (Id = 0) or via the remote LUCM Modbus terminal port (value 0 written to register **680**).

Timeout Duration (Reg 681)

Register **681** (accessible in read/write mode) is used to set or read the value of the timeout on loss of communication with the PLC. Following a loss of communication, the timeout corresponds to the time before switching to fallback mode. Loss of communication causes a warning, which is signaled by register 460 = 109.

Reg•	Value	Range	Unit	Factory value	Comment
681	-	0 - 65535	10 ms	6000	Value of timeout The value 0 represents a time of zero.

Fallback Mode (Reg. 682)

Register **682** (accessible in read/write mode) is used to configure the fallback mode in the event of loss of communication with the PLC.

Fallback mode	Value	Comment
Inhibited (no fallback)	0	No detection of loss of communication
Frozen	1	No change in the control states is authorized when loss of communication is detected Any new command will only be taken into account after acknowledgment of the loss of communication (703.3)
Forced stop (factory value)	**2**	**Outputs OA1 = 0 and OA3 = 0**
Unchanged	3	A change in the control states is authorized when loss of communication is detected Any new command can be taken into account before acknowledgment of the loss of communication (703.3)
Forced operation, direction 1	4	Output OA1 = 1 (forward) and (OA3 = 0)
Forced operation, direction 2	5	(OA1 = 0) and output OA3 = 1 (reverse)

Note: The red "ERR" LED flashes to indicate a loss of communication (fault on timeout).

Control Mode (Local/Bus) With an LUTM Controller (Reg. 683)

Control of outputs 13 and 23 of the LUTM controller depends on the operating mode selected in register **683**.

Value	Operation		Comment
0	"**Remote via the bus**" mode	Outputs 13 and 23 are only controlled by the bus. *The state of inputs I.1 and I.2 does not impact outputs 13 and 23.*	
1	"**Local**" mode	Outputs 13 and 23 are only controlled by inputs **I.1** and **I.2**. *Commands via the bus are not taken into account.*	
2	"**Mixed**" mode (input **I.10** has priority)	"**Local**" mode if **I.10** = 1	Outputs 13 and 23 are only controlled by inputs **I.1** and **I.2**. *Commands via the bus are not taken into account.*
		"**Remote via the bus**" mode if **I.10** = 0	Outputs 13 and 23 are only controlled by the bus, from the PLC. *The state of inputs I.1 and I.2 does not impact outputs 13 and 23.*

Note: Commands transmitted during communication are passed directly to the output relays, without wiring between the communication module outputs and inputs **I.1** and **I.2**.

Inversion of the Output State (Reg 684)

Depending on requirements (signaling, run, stop, etc), it is possible to assign NO or NC behavior to outputs OA1, OA3 and LO1, by configuring register **684**.
To do this, define the output concerned ==> register **684**.

Power base	Bit
Invert output OA1	_.0 = 1
Invert output OA3	_.1 = 1
Invert output LO1	_.2 = 1

Setting the Parameters of Output LO1 (Reg 685 LSB)

To modify the assignment (factory value), write another value (0 to 45), referring to the "TeSys U Communication Variables" User's Manual.
Assignment/control (factory value) of output LO1 of the LULC032-033 Modbus communication module is as follows:

Reg•	Bit	Value	Factory value	Comment
685	0 to 7	0 to 45	2	Output LO1 = state of register 700.0 (control of output LO1)

Setting the Parameters of Output OA1 (Reg 686 LSB)

Assignment/control (factory value) of output OA1 of the LULC032-033 Modbus communication module is as follows:

Reg•	Bit	Value	Factory value	Comment
686	0 to 7	0 to 45	12	Output OA1 = state of register 704.0 (control of output OA1)

Setting the Parameters of Output OA3 (Reg 686 MSB)

Assignment/control (factory value) of output OA3 of the LULC032-033 Modbus communication module is as follows:

Reg•	Bit	Value	Factory value	Comment
686	8 to 15	0 to 45	13	Output OA3 = state of register 704.1 (control of output OA3)

Setting the Parameters of Output 13 (Reg 687 LSB)

Assignment/control (factory value) of output 13 of the LUTM controller is as follows:

Reg•	Bit	Value	Factory value	Comment
687	0 to 7	0 to 45	12	Output 13 = state of register 704.0 (control of output 13)

Setting the Parameters of Output 23 (Reg 687 MSB)

Assignment/control (factory value) of output 23 of the LUTM controller is as follows:

Reg•	Bit	Value	Factory value	Comment
687	8 to 15	0 to 45	13	Output 23 = state of register 704.1 (control of output 23)

Recovery Mode After Stopping (Reg 688)

This is a protection against possible unintended equipment operation. Activate it if you do not wish the outputs to go back to the state they were in before the power cut, by changing its value to 1.

Control Unit Forcing (Reg 690)

The control unit is identified automatically, but identification can be forced.

Value	Comment
0	Default value. The system automatically identifies the type of control unit connected (standard, advanced, multifunction)
1	If the value is set to 1, this deactivates automatic identification and forces identification of a standard or advanced control unit.
2	If the value is set to 2, this deactivates automatic identification and forces identification of a multifunction control unit.

Note: (Read/Write) registers 681 to 690 can also be accessed via the LUCM keypad.

Modbus Requests and Programming Examples

Modbus Requests

The recognized Modbus requests are as follows:

Code value		Name	Comment
Hexadecimal	Decimal		
0x03	3	Read multiple registers	Read mode
0x06	6	Write single register	Write mode
0x10	16	Write multiple registers	
0x2B	43	Read register identification	Read mode for identifying the LULC032-033 Modbus communication module

The maximum number of registers per request is limited to 100.

Note: The "Broadcast" function is supported. To use it, a write operation (code 6 or 16) to address 00 is necessary.

⚠ WARNING

UNEXPECTED OPERATION

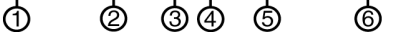
Use of this device on a Modbus network that uses the broadcast function should be considered with caution.
This device has a large number of registers that must not be modified during normal operation.
Unintended writing of these registers by the broadcast function may cause unexpected and unwanted product operation.
For more information, refer to the "TeSys U Communication Variables" User's Manual.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

Example of a Read Operation

The example below describes a READ_VAR request, within a TSX Micro or Premium platform, in order to read the motor-starter states at address 4 (slave no. 4) contained in internal word MW0:

```
If %M0 AND NOT %MW100:X0 THEN READ_VAR(ADR#3.0.4,'%MW',455,1,%MW0:1,%MW100:4) :RESET %M0;
EN_IF;
```



1 Address of the module with which you wish to communicate: 3 (module address), 0 (channel), 4 (module address on the bus)

2 Type of PL7 objects to be read: MW (internal word)

3 Address of the first register to be read: 455

4 Number of consecutive registers to be read: 1

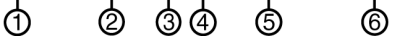
5 Word table containing the value of the objects read: MW0:1

6 Read report: MW100:4

Example of a Write Operation

The example below describes a WRITE_VAR request, within a TSX Micro or Premium platform, in order to control a motor-starter by sending the content of internal word MW 502:

```
If %M0 AND NOT %MW200:X0 THEN WRITE_VAR(ADR#3.0.4,'%MW',704,1,%MW502:1,%MW200:4) :RESET %M10;
EN_IF;
```



1 Address of the module with which you wish to communicate: 3 (module address), 0 (channel), 4 (module address on the bus)

2 Type of PL7 objects to be written: MW (internal word)

3 Address of the first register to be written: 704

4 Number of consecutive registers to be written: 1

5 Word table containing the value of the objects to be sent: MW502:1

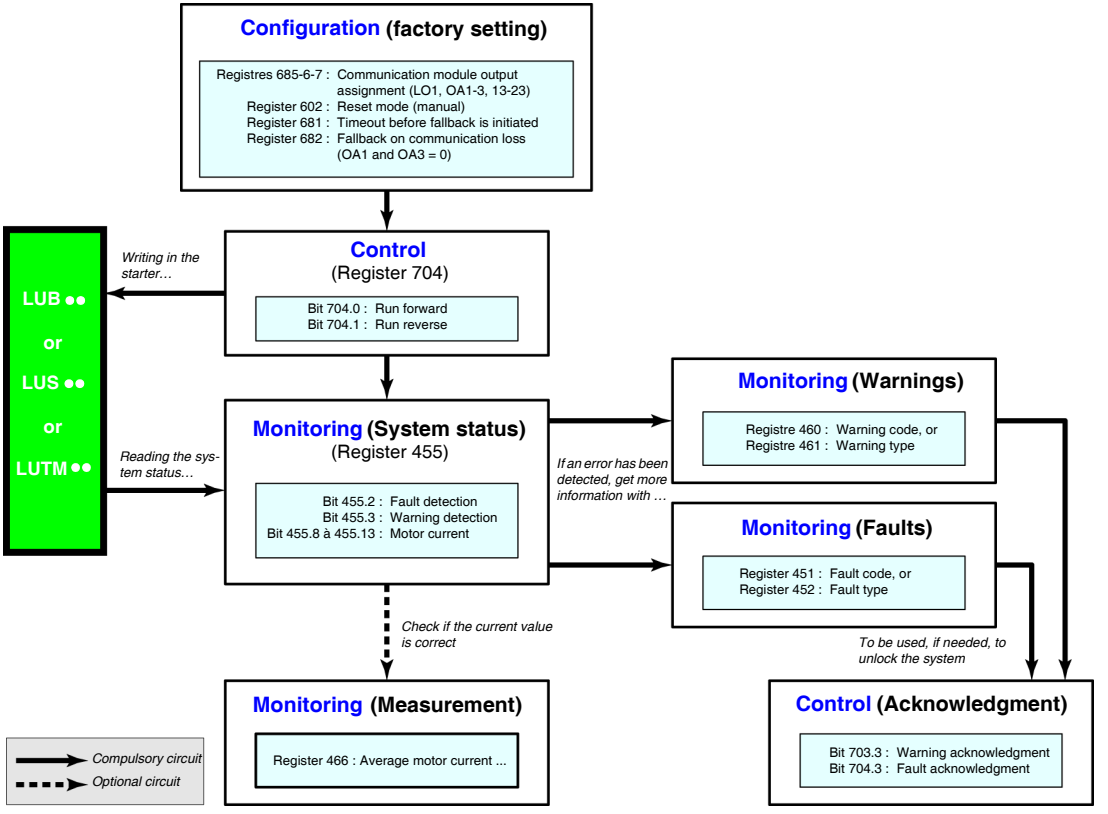
6 Write report: MW200:4

Use of the Main Registers for Simplified Management

Before setting up a motor-starter, it is useful to know which of the main registers are invoked, and in what order.

Schematic of Register Usage

The schematic below provides basic setup information, using the following registers: configuration, control and monitoring (system state, measurements, faults and warnings, acknowledgment). Starting with the factory configuration (predefined), you will easily be able to follow or anticipate how your system behaves.


Configuration (factory setting)
Registres 685-6-7 : Communication module output assignment (LO1, OA1-3, 13-23)
Register 602 : Reset mode (manual)
Register 681 : Timeout before fallback is initiated
Register 682 : Fallback on communication loss (OA1 and OA3 = 0)
LUB ●●
or
LUS ●●
or
LUTM ●●
Writing in the starter…
Control
(Register 704)
Bit 704.0 : Run forward
Bit 704.1 : Run reverse
Reading the system status…
Monitoring (System status)
(Register 455)
Bit 455.2 : Fault detection
Bit 455.3 : Warning detection
Bit 455.8 à 455.13 : Motor current
If an error has been detected, get more information with …
Monitoring (Warnings)
Registre 460 : Warning code, or
Registre 461 : Warning type
Monitoring (Faults)
Register 451 : Fault code, or
Register 452 : Fault type
Check if the current value is correct
To be used, if needed, to unlock the system
Monitoring (Measurement)
Register 466 : Average motor current ...
Control (Acknowledgment)
Bit 703.3 : Warning acknowledgment
Bit 704.3 : Fault acknowledgment
Compulsory circuit
Optional circuit

Fault and Warning Management

4

Introduction to Faults and Warnings

Introduction

This chapter shows how to manage the various types of fault and warning that may occur.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Displaying Faults	64
Application Faults	65
Warnings - Loss of Communication	67
Internal faults	69

Displaying Faults

The presence of a fault is signaled by various indicators:

- State of the LEDs on the LULC032-033 Modbus communication module

With a power base:
- State of the power base rotary knob (0 or "trip")
- State of the output relays

With a controller base:
- State of the LEDs on the controller base
- State of the output relays

With a standard or advanced control unit:
- Internal signals sent to the LULC032-033 Modbus communication module

With a multifunction control unit:
- Warning
- Message(s) displayed on screen
- Internal dialog with the LULC032-033 Modbus communication module

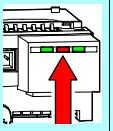
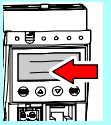
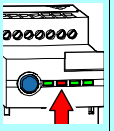
- Presence of an exception code (report from the PLC). See *Exception Code, p. 52*.

Note: The warning and the fault are taken into account in the relevant registers. For more information, refer to the "TeSys U Communication Variables" User's Manual: monitoring of faults (registers 450 to 452) and monitoring of warnings (registers 460 to 461).

Application Faults

Acknowledgement of Application Faults

The possible application faults are listed below. Their reset (or acknowledgement) method can be: manual/automatic/remote.

Application faults	Registers		LULC032 LULC033	LUCM•	LUTM	Fault acknowledgement
	451 Fault number	452 Fault bit	 "ERR"	 (line 2)	 "FAULT"	
Short-circuit fault	1	_.0 = 1	Off	SC	-	Manual reset
Overcurrent fault	2	_.1 = 1		I>>	-	
Thermal overload fault	4	_.3 = 1		Overload	-	According to the reset mode configured in register 602
Application fault in the LUCM• multifunction control unit	3 and 5 to 12	Refer to the User's Manual for the LUCM••BL or LUCMT1BL multifunction control unit				

Overload Fault With LU•B•/LU•S• Power Base

Following a thermal overload fault, either the rotary knob or the blue pushbutton on the front panel can be used, irrespective of which reset mode has been configured.

Configuration register	Reset (acknowledgement)	Method
602.0 = 1	direct "**manual**"	With the rotary knob on LU•B• With the blue pushbutton on LU•S•
	remote "**manual**"	With the LU9 AP•• kit on LU•B• With the LU9 •• kit on LU•S•
602.1 = 1	"**remote**"	Acknowledgement by setting bit 704.3 to 1
602.2 = 1	"**automatic**"	Managed by the control unit

Overload Fault With LUTM Controller Base

Following a thermal overload fault, either the blue pushbutton on the front panel or input I.5 can be used, irrespective of which reset mode has been configured.

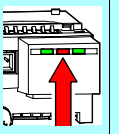
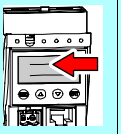
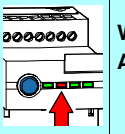
Configuration register	Reset (acknowledgement)	Method
602.0 = 1	local **"manual**"	With the blue pushbutton on the front panel
	remote "**manual**"	With the reset button on the front of the rack or control panel (via Input **I.5**)
602.1 = 1	"**remote**"	Acknowledgement by setting bit 704.3 to 1
602.2 = 1	"**automatic**"	Managed by the control unit

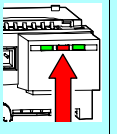
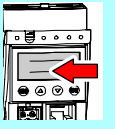
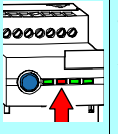
Note: The reset mode must be configured.

Warnings - Loss of Communication

Acknowledgement of Warnings

List of possible warnings.

Warnings	Registers		LULC032 LULC033	LUCM•	LUTM	Warning Acknowledgement
	460 Warning number	461 Warning bit	 "ERR"	 (line 1)	 "FAULT"	
Thermal overload warning	4	_.3 = 1	-	Overload warning	-	Automatic when the overload is less than 85%
Loss of communication with the master warning	109	_.15 = 1	Flashing	Comm Loss	-	Write: 703.3=1
LUCM• multifunction control unit warning	2 and 4 to 13	Refer to the User's Manual for the LUCM••BL or LUCMT1BL multifunction control unit				

Warnings	Registers		LULC032 LULC033	LUCM•	LUTM	Warning Acknowledgement
	460 Warning number	461 Warning bit	 "ERR"	 (line 1)	 "FAULT"	
LUTM external warning indicated by I.6 changing to 0	201	_.15 = 1	-	Warn-M201	Refer to the LUTM controller user's manual	Automatic with I.6 returning to 1

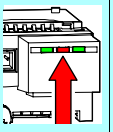
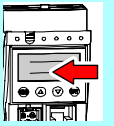
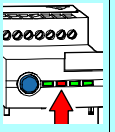
Recovery After Loss of Communication

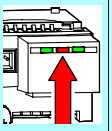
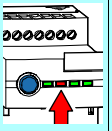
After acknowledgement by setting bit 703.3 to 1, recovery occurs according to the states of control bits 704.0 and 704.1.

Internal faults

Acknowledgement of Internal Faults

List of possible internal faults.

Internal faults	Registers		LULC032 LULC033	LUCM•	LUTM	Fault acknowledgement
	451 Fault number	452 Fault bit	 "ERR"	 (line 2)	 "FAULT"	
Fault in the LULC032-033 Modbus communication module	14	-	Off	M14	-	Power down and then power up the LULC032-033 and the LUCM•
LULC032-033 Modbus communication module not installed or not supplied with power, or loss of communication with the module	15	-		M15	-	
Internal fault in the LUC•• control unit	54	_.11 = 1		M54	-	
Fault in the LUCM• multifunction control unit	51 to 53, 55 to 63	Refer to the User's Manual for the LUCM••BL or LUCMT1BL multifunction control unit				
Write-to-EEPROM fault	100	_.13 = 1	On	M100	-	Power down and then power up the LULC032-033
Communication fault with the LUCM• multifunction control unit	101	_.12 = 1	On	M101	Flashing	Power down and then power up the LULC032-033
Checksum fault in EEPROM	102	_.13 = 1	On	M102		Write: 704.3=1
EEPROM configuration fault	104	_.13 = 1	On	M104		Write: 704.3=1
Communication fault with the LUTM controller base	105	_.13 = 1	On	M105		Power down and then power up the LULC032-033

Internal faults	Registers		LULC032 LULC033	LUCM•	LUTM	Fault acknowledgement
	451 Fault number	452 Fault bit	 "ERR"	(line 2)	 "FAULT"	
Communication fault with the LULC032-033 module	205	_.13 = 1	On	-	Refer to the LUTM controller User's Manual	Power down and then power up the LUTM
No control unit	206					Power down and then power up the LUTM

Configuration of Predefined Functions

5

Introduction to the Predefined Functions

Introduction

This chapter describes the predefined functions.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Description of Reflex Stop Functions	72
Use of Reflex1 and Reflex2	74

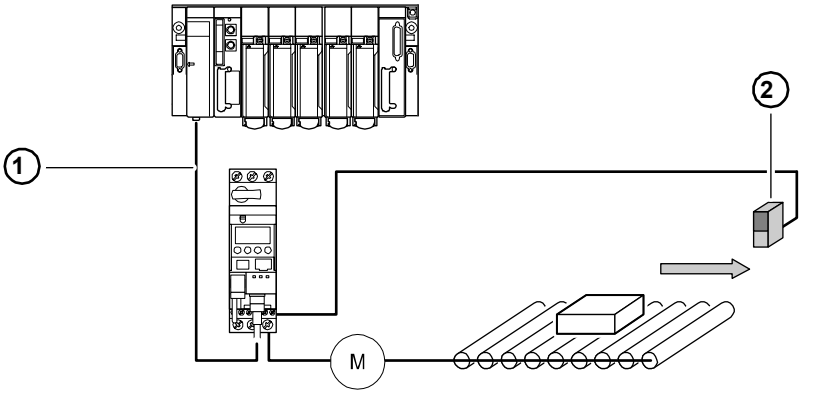
Description of Reflex Stop Functions

The reflex stop ensures accurate repeated position control, unhindered by the bus and PLC scan times.
There are two types of reflex stop function:

- Reflex1: "Reflex stop 1" function
- Reflex2: "Reflex stop 2" function

Description of Reflex1

Sensor no. 1 (logic input LI1) directly controls motor stopping.
After a new run command (stop command then run command), the motor restarts even if something is still detected (LI1=1).



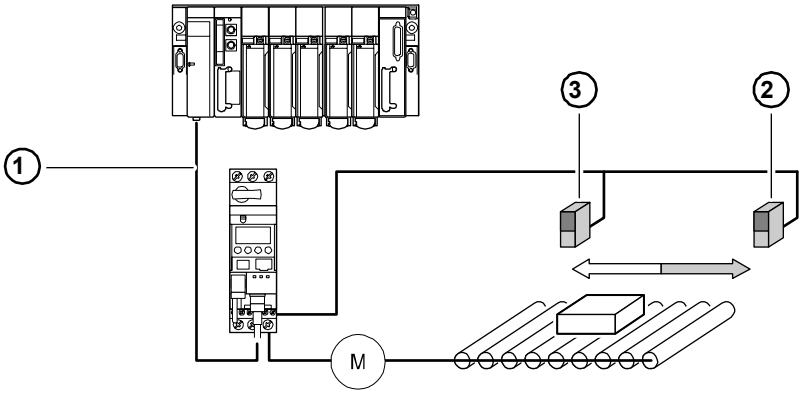
1 Bus **2** Sensor no. 1 (LI1)

Note: In the case of a reversing starter, the reflex stop works in both directions.

Data sequence

Description of Reflex2

Sensor no. 1 (logic input LI1) controls motor stopping in forward mode.
Sensor no. 2 (logic input LI2) controls motor stopping in reverse mode.
After a new run command (stop command then run command), the motor restarts even if something is still detected (LI1 or LI2 = 1).



1 Bus **2** Sensor no. 1 (LI1) **3** Sensor no. 2 (LI2)

Note: Sensor no. 2 (LI2) does not impact forward mode and sensor no. 1 (LI1) does not affect reverse mode.

Use of Reflex1 and Reflex2

To use a "reflex stop" function, it must be selected in the register of the output to be monitored.

Reflex function	Direction of motor rotation	Value of Reg•	LUB••/S•• - LU2B••/2S•• base		LUTM•• base
			Output LO1	Outputs OA1 OA3	Outputs 13 23
Reflex1	Reflex1.Fw = forward	8	Reg685 (LSB)	Reg686 (LSB) (MSB)	Reg687 (LSB) (MSB)
	Reflex1.Rev = reverse	9			
Reflex2	Reflex2.Fw = forward	10			
	Reflex2.Rev = reverse	11			

Note: Before using the "reflex stop" functions, outputs OA1/OA3 must first be assigned to the forward/reverse directions. This selection is made in register **686**. By default, OA1 is assigned to forward and OA3 to reverse.

Reflex1.Fw

This function is active on a rising edge and not on the level.

.Fw	LI1 = 1 stops the motor, irrespective of the chosen direction of operation. After a new run command (stop command followed by a run command), even if logic input LI1 = 1, the motor restarts in the chosen direction.

Note: Logic input LI2 is not used.

Reflex1.Rev This function is active on a rising edge and not on the level.

.Rev	LI1 = 1 stops the motor, irrespective of the chosen direction of operation. After a new run command (stop command followed by a run command), even if logic input LI1 = 1, the motor restarts in the chosen direction.

Note: Logic input LI2 is not used.

Reflex2.Fw This function is active on a rising edge and not on the level.

.Fw	Logic input LI1 = 1 stops the motor in forward mode. Logic input LI2 = 1 stops the motor in reverse mode. After a new run command (stop command followed by a run command), even if logic input LI2 = 1, the motor restarts.

Note: Logic input LI2 does not affect forward mode and logic input LI1 does not affect reverse mode.

Reflex2.Rev This function is active on a rising edge and not on the level.

.Rev	Logic input LI2 = 1 stops the motor in reverse mode. Logic input LI1 = 1 stops the motor in forward mode. After a new run command (stop command followed by a run command), even if logic input LI2 = 1, the motor restarts.

Note: Logic input LI2 does not affect forward mode and logic input LI1 does not affect reverse mode.

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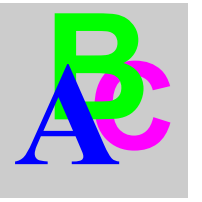

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